

## REMARKS

### (A) STATUS OF THE APPLICATION

Applicants thank the Examiner for the explanation of rejections in the Non-Final Office Action dated November 29, 2006.

#### (I) DISPOSITION OF CLAIMS

- (i) Claims 1, 3, 4, and 6-8 are pending in the application.
- (ii) Claims 2, 5, and 9 were previously canceled.
- (iii) Claims 1, 3, 4, and 6-8 are rejected under 35 U.S.C. § 103(a).

#### (II) APPLICANTS' ACTION

- (i) Applicants respond to the above rejections.

In the ensuing discussion, comments under the sub-heading "Examiner's Comments" are attributed to the Examiner. Unless specified, Applicants do not generally agree with the assertions made by the Examiner under that sub-heading. Applicants give their views in the comments under the sub-heading "Applicants' Response."

### (B) RESPONSE TO REJECTION UNDER 35 U.S.C. § 103(A) OVER U.S. PAT. PUB. NO. US 2002/0071918 A1 TO EMCH, IN VIEW OF U.S. PAT. PUB. NO. 2003/0031804 A1 TO REKOWSKI, ET AL., U.S. PAT. NO. 6,677,260 TO CRANE ET AL., AND U.S. PAT. NO. 4,837,478 TO ANZAI, ET AL.—CLAIMS 1, 3, 4, & 6-8

#### (I) Examiner's Comments

Claims 1, 3, 4, & 6-8 were rejected under 35 U.S.C. 103(a) as being unpatentable over

- (a) U.S. Pat. Pub. 2002/0071918 to Emch (*hereinafter*, "Emch"); in view of
- (b) U.S. Pat. Pub. 2003/0031804 to Rekowski, et al. (*hereinafter*, "Rekowski");
- (c) U.S. Pat. 6,677,260 to Crane, et al. (*hereinafter*, "Crane"); and
- (d) U.S. Pat. 4,837,478 to Anzai, et al. (*hereinafter*, "Anzai").

Emch discloses powder coating a substrate followed by treatment with 700-7000 nm-wavelength, near infrared (NIR) radiation. Emch does not teach using a filter coated with borosilicate glass, silica glass, or vitreous ceramics, such that the NIR wavelength

range can be restricted to 250-3000 nm with a further restriction, primarily in the range of 750-1200 nm. The Examiner recognizes this deficiency in Emch.

Rekowski discloses powder coating of substrates (e.g., a car), and a NIR radiation curing. The wavelength range for the NIR radiation is 760-1500 nm. Coatings cured in this range demonstrate rapid cure, sufficient hardness, and good surface quality.

Crane discloses a silica glass capable of absorbing UV radiation and filtering in the visible region that can be used for tungsten-halogen lamps and other high temperature light sources. The glass has a transmission greater than 90% in the NIR region of 760-2500 nm.

Anzai discloses a device radiating NIR light. The device comprises a filter that absorbs visible light, but transmits NIR light. The filter is glass-coated with an absorbing agent such as molybdenum oxide or chromium oxide. The absorbing agents transmit zero in the visible light region and greater than 80% in the 750-1000 nm wavelength.

A person of ordinary skill in the art will find it obvious to modify the Emch process with the Rekowski wavelengths because both disclose powder coating for three-dimensional objects with NIR irradiation. Rekowski further discloses that a 760-1500 nm wavelength provides rapid curing, sufficient hardness, and good surface quality, and therefore there is a reasonable expectation of success.

Additionally, the skilled person will find it obvious to modify the combined Emch-Rekowski process to include the Crane and Anzai filters. Such person would be motivated to do so because Rekowski uses the wavelength range of 760-1500 nm but does not show how to restrict the wavelengths. Crane, on the other hand, teaches a silica glass that is capable of transmitting in NIR region, when used with a halogen lamp and Anzai teaches a coating applied to glass that will shorten transmitted wavelength range to 750-1000. Thus one would also have a reasonable expectation of success in arriving at the Claim 1 invention.

## (II) Applicants' Response

Applicants disagree with the Examiner's interpretation and combination of the references above.

Section 2142 of the MPEP indicates that a *prima facie* case of obviousness is established only when the following three conditions are collectively met:

- (1) all of the claim limitations are either taught, or suggested by the cited prior art;
- (2) there is some suggestion or motivation to modify or combine the cited prior art references; **AND**
- (3) there is a reasonable expectation of successfully producing the claimed invention via such a combination.<sup>1</sup>

Applicants contend that the Examiner has not met the burden of proving *prima facie* obviousness because none of the three required conditions (*supra*) are met.

The Examiner stipulates that Emch does not teach the use of a filter coated with borosilicate glass, silica glass, or vitreous ceramic to restrict the range of the NIR wavelength to 250-3000 nm with a further restricted wavelength primarily in 750-1200 nm range.

But more importantly, in regards to the present invention, Emch does not recognize the problem that Applicants have solved. Applicants, by their process, have formed high-quality coatings that preclude air-entrapment in the powder coating. The preclusion improves gloss, appearance, impact and flex of the resultant coating.

Emch, on the other hand, teaches application of powder coatings followed by curing with high-energy radiation. But neither does it restrict the radiation to the primary NIR range of 750–1200 nm by the use of filters, nor does it recognize the problems that occur when curing without restricting the primary NIR range to 750-1200 nm.

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<sup>1</sup> From MPEP § 2142, “[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).”

Particularly, in Examples on Pages 6-8, and in Figures 1 and 2 in the Specification, Applicants show a comparison between a powder coating cured without the NIR filter and the same powder coating cured with the NIR filter.

According to the Table on Page 7, when the NIR filter is used, air is not entrapped, and there is improvement in gloss, flow, impact resistance, and flexural strength of coatings. On the other hand, when the NIR filter is not used, air is entrapped (see Figure 1), and there is no improvement in gloss, flow, impact resistance, and flexural resistance of the coatings.

Essentially, the Emch process is equivalent to curing without an NIR filter. The appearance of powder coatings cured with and without the use of an NIR filter is illustrated in Figures 1 and 2 of the present Specification. Figure 1 shows the coating cured without a NIR filter while Figure 2 shows the coating cured with an NIR filter. The appearance of Figure 2 (the invention) is significantly better than Figure 1 (representative of the prior art).

In regards to Rekowski, the Examiner recognizes that Rekowski does not teach or suggest the use of filters to achieve the wavelength range that Applicants achieve in their process by the use of appropriate filters. In fact, Rekowski simply uses conventional radiation emitters to cure the powder coating compositions to ensure that an NIR radiation is used. Rekowski does not use filters at all. In particular, see Rekowski, Example 2, Paragraph [0091] wherein a commercial radiation emitter, High-Burn radiation emitter from Adphos, is used. The attached document<sup>2</sup> discusses the curing of powder lacquers (from IndustrieSerVis Company, now Adphos). Figure 2 in that document shows the radiation distribution (Planck) of an emitter in the IR range. The emitter covers a wavelength spectrum in the range of about 250 to 6000 nm.<sup>3</sup> Applicants submit that, when using such high-energy emitters, which include a broad band of radiation, including NIR, but without the use of a filter, the results would be the same as in Applicants' comparative Example discussed above, i.e., poor appearance of the resultant cured coating.

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<sup>2</sup> "Sekundenschnelle Aushärtung von Pulverlacken", Kia Bär, (English Translation, ET, attached)

<sup>3</sup> *Id.*, English Translation, Pages 2-3; describing the energy of such emitters.

It should be noted that Rekowski determines only the hardness of the cured coating in Example 2, Paragraph [0096]. Rekowski does not address the issue of the appearance of the resulting coating. Figures 1 and 2 of Applicants' Specification clearly show the difference between the grainy appearance of a coating cured with a broad wave length emitter (Figure 1) compared to the smooth and even appearance of a coating cured with an emitter having a filter with a primary NIR range of 750-1200 nm (Figure 2). Rekowski's teachings have been recognized by Applicants on Page 1, starting at Line 22 of the Specification. Applicants recognized Rekowski as providing inferior coatings. Clearly, combining Rekowski with Emch will not improve the result either.

Applicants' process is advantageous in that, because it can be used with conventional IR radiation emitters, the automotive and truck manufacturing industry is not forced to replace old equipment for new equipment. An appropriate filter would suffice to provide the advantages of Applicants' process, as set forth in Claim 1, to allow for the exposure of a powder coating to NIR radiation in the 750-1200 nm wavelength range. This certainly is not taught or suggested by either Emch or Rekowski.

A person skilled in the art would not be motivated to combine Crane and Anzai with the Emch-Rekowski process because Crane and Anzai use filters for completely different applications.

Crane discloses glasses having a high transmission through a visible region and the NIR region. These glasses can absorb UV radiation and can filter out the yellow light in the visible spectrum region. They are suitable as lamp envelopes, particularly in low-cost lamp systems that are meant to provide alternatives to high-intensity discharge (HID) lamps in a high performance vehicle lighting system.<sup>4</sup> These glasses can also be used for other applications where high contrast and "enhanced visible properties" of transmitted or reflected visible light can be a benefit, e.g., ophthalmic uses such as sunglasses, glass hosts for lasers, computer screens, and rear view mirrors with reduced glare.<sup>5</sup> Therefore, clearly the Crane glasses are used for applications completely different from that of the present application. As noted previously, the invention relates to applying and curing a powder coating using NIR radiation.

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<sup>4</sup> See Crane, Col. 3, Lines 66-67, and Col. 4, Lines 1-9..

<sup>5</sup> *Id.* at Col. 3, Lines 47-54.

Also, Crane does not supplement the deficiencies of Emch and Rekowski, discussed previously, as Crane relates to a entirely different use. In fact, doing so would amount to hindsight reconstruction which is not permitted according to MPEP § 2144.

Applicants agree that "[i]t is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose. . . . [T]he idea of combining them flows logically from their having been individually taught in the prior art."<sup>6</sup> However, the two applications, i.e., Emch-Rekowski and Crane, are in completely different field. Crane relates to optics. Emch-Rekowski relate to painting and curing coats on solids. Both use NIR light. But, Applicants emphasize that their invention is not the NIR light. Both the invention and the references use NIR light. The similarity ends there.

Additionally, Crane does not describe or use coated glasses in its application. Coated glasses or ceramics, on the other hand, are described and necessary for the present invention. Coated filters are expressly mentioned, for example, in Claim 1 of the invention. That the filters of the invention can be coated on one or both sides (Claim 6, for example) is also not disclosed in Crane.

Combining Anzai with Emch, Rekowski, and Crane does not help to make a *prima facie* case of obviousness, either. Anzai does not supplement the deficiencies of Emch, Rekowski and Crane combined to arrive at the invention of Claim 1. Anzai relates to a entirely different use. In fact, combining Emch, Rekowski, Crane and Anzai would amount to hindsight reconstruction, which is not permitted according to MPEP § 2144.

Applicants agree that "[i]t is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition to be used for the very same purpose. . . . [T]he idea of combining them flows logically from their having been individually taught in the prior art."<sup>7</sup> But, the purposes of Emch-Rekowski, Crane, and Anzai are all different. Anzai, in particular, describes an NIR illuminator and image pick-up device comprising a filter which

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<sup>6</sup> In re Kerkhoven, 626 F.2d 846 (CCPA 1980).

<sup>7</sup> *Id.*

removes the visible region and permits the NIR region, e.g., in the 750-1000 nm wavelength range. This range of light is not perceived by humans. Thus, it can be used as a crime-prevention and monitoring device because the light range is not visible in the dark.<sup>8</sup> Clearly, this application is not even remotely related to the present invention of curing paints and coatings.

Additionally, the Anzai filter glass is prepared by mixing in the lead glass, an absorbing agent such as  $\text{MnO}_2$  or  $\text{Cr}_2\text{O}_3$ , or by varying the absorbing agent to be mixed into the filter glass.<sup>9</sup> In contrast, in the present invention, the filters are coated, either on one side or both sides. Therefore, the first condition of the *prima facie* obviousness test is not met. None of the references disclose a coated filter, which is essential to the present invention.

Therefore, the second condition of the *prima facie* obviousness test is not satisfied as the references are not combinable, either for a lack of suggestion of such combination or for the lack of motivation of such combination.

Applicants do not deny that Anzai, Crane, Emch-Rekowski, and the Applicants' invention, all use NIR wavelengths (and some even in a similar range). But then again, the invention is not the NIR wavelength range. Anzai technology relates to crime prevention and Crane relates to optics, but the present invention relates to curing of paints on three-dimensional substrates, cars, for example.

A person skilled in the art, therefore, can have no motivation to combine the references (clearly, there is no suggestion to combine), because according to the MPEP, "the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggest the desirability of the combination."<sup>10</sup> Nor would such a person have a reasonable expectation of successfully arriving at the invention of Claim 1 (particularly in light of the Anzai difference in addition of absorbing agent). Thus, the third condition of the *prima facie* obviousness test is also not satisfied.

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<sup>8</sup> See Anzai, Col. 2, Lines 37-50.

<sup>9</sup> See Col. 3, Lines 25-26 and Lines 58-61.

<sup>10</sup> MPEP § 2143.01, Part III (citing *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990)).

Because Claims 3, 4, and 6-8 are dependent directly or indirectly on Claim 1, said claims are also not obvious over the combined references.

In light of the above arguments, as none of the three conditions are satisfied, Applicants submit that the Examiner has not met the burden of establishing a *prima facie* case of obviousness under 35 U.S.C. § 103(a). Applicants respectfully request that the Examiner withdraw rejections of Claims 1, 3, 4, and 6-8 and allow said claims.



**CONCLUSION**

In view of the above remarks, Applicants respectfully submit that the stated grounds of rejection have been properly traversed, accommodated, or rendered moot and that a complete response has been made to the Non-Final Office Action mailed on November 29, 2006.

Therefore, Applicants believe that the application stands in condition for allowance with withdrawal of all grounds of rejection. A Notice of Allowance is respectfully solicited.

If the Examiner has questions regarding the application or the contents of this response, the Examiner is invited to contact the undersigned at the number provided.

Should there be a fee due which is not accounted for, please charge such fee to Deposit Account No. 04-1928 (E. I. du Pont de Nemours & Co.).

Respectfully Submitted,

By:

DATE: FEBRUARY 27, 2007



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